Pacific Fisheries Resource Conservation Council

BACKGROUND PAPER NO. 2000/1

Water Use Planning: A Tool to Restore Salmon and Steelhead Habitat in British Columbia Streams

Prepared by

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1. Summary

Water is essential for life. It is vital for living organisms — fish, plants and humans — as well as commerce and industry, including agriculture, manufacturing and hydro-electric power. With all the conflicting demands for water, priorities must be set for its use. Clearly, providing water to maintain and conserve living natural resources has to take a level of priority over other uses. Currently, many western North American heritage plants and animals are being lost due to careless use of water and this cannot be rectified until they attain preferred status for access to this important life-giving resource. Salmon and steelhead populations include some of the species that are impacted by excessive human use of water.

Water law guides the allocation of water to human user; however, the current British Columbia *Water Act* does not recognize fish as a legitimate user of water. That is, it does not specifically protect salmon and steelhead from over-abstraction of water from streams. Nonetheless, there is other water-related legislation that deals with requirements to protect flows for salmon and steelhead, including the *Canada Fisheries Act* and the new British Columbia *Fish Protection Act*. To date, these two fisheries statutes have had limited effectiveness in ensuring that salmon and steelhead get the amount of water needed for survival or to ensure habitat capability of a stream.

Water use planning is a supplementary process that falls under the aegis of the British Columbia *Water Act*, and is now showing great promise in dealing with conflicts amongst owners of water licences and non-licenced users of water, such as fish and aquatic resources. In the development of a Water Use Plan (WUP), there is the requirement to recognize other existing legal and constitutional rights and responsibilities, as set out in legislation and court decisions. Simply put, the WUP is a technical document that defines the detailed operating parameters to be used for each facility in its day-to-day decisions. The primary end product of this process is a WUP that is "attached" to a facility (e.g., hydro-electric project, agricultural intake, commercial water diversion) and its water licences. A WUP is a legal and living document describing how an operator must act in order to ensure that all water-using stakeholders are protected, yet still respects the rights accorded to the licence holder. This can ensure that salmon and steelhead habitat is afforded a degree of protection.

Water use planning may be initiated in a number of different ways. It may be required by the Comptroller of Water Rights as a condition of a new licence, as part of a review of an existing licence, or as a result of a conflict with regards to an existing licence. Because the WUP is intended to clarify how rights to provincial water resources should be exercised, and to consider the multiple uses of those resources, all parties that may be affected by the implementation of a plan, or are interested in it, are invited to be participants in its development. This normally includes First Nations, local governments, fisheries agencies, special interest groups and the general public. A WUP is prepared through a collaborative effort of these groups. At the end of the public exercise, a draft WUP is submitted by the licence holder or applicant to the Comptroller of Water Rights for ratification. A Water Use Plan may also be initiated by the licence holder.

The water use planning process gives all interested parties the opportunity to explore the costs and benefits of changes to a system operations of a facility and make informed decisions about changing the balance between licenced and other (e.g., fisheries) values. Currently, BC Hydro is undergoing a water use planning exercise for its electrical facilities around the province. Draft Water Use Plans have been submitted by BC Hydro to the Comptroller of Water Rights for the Alouette and Stave River watersheds, and there are WUP consultations underway for the Campbell River, Coquitlam River, Cheakamus River and Bridge-Seton watersheds with others to follow shortly. The value of this exercise for fish and aquatic resources has been significant but WUPs also have the opportunity to be expanded to other non-BC Hydro water issues around the province. Hence, water use planning may prove to be one of the more effective tools in rationalizing licenced water use and protecting fish and aquatic resources in British Columbia.

2. Introduction

Widespread declines in salmon and steelhead populations have occurred in British Columbia over the last number of decades. The exceptionally poor returns of these stocks to their spawning grounds within the last five years has emerged as a pressing management issue for both the federal and provincial governments. This phenomenon has been particularly evident for Georgia Basin and southern interior coho, and Georgia Basin steelhead. Because of the value that society places on these species, both levels of government have now begun to take a strong approach in their harvest-management plans including the widespread closures for steelhead and coho implemented by the BC Ministry of Environment, Lands and Parks, and Fisheries and Oceans Canada.

The two levels of government have also increased efforts to protect and restore the freshwater habitat for salmon and steelhead. Recent government initiatives include the promulgation of the *Forest Practices Code of BC Act* and the development of the Forest Renewal BC-funded Watershed Restoration Program which redresses old forest harvesting impacts on streams. It also comprises the passing and implementation of parts of the British Columbia *Fish Protection Act* and other programs (see Rosenau and Angelo 1999). Also included in this suite of endeavors is the new water use planning initiative.

Water is a common resource that has allowed ecosystems and society in British Columbia to thrive and flourish. Much of this province is well endowed with bountiful, high-quality water resources that have contributed to this richness (Day and Affum 1990). However, increasing human populations have put a significant strain on many watersheds. Furthermore, where high rates of water extraction, diversion and impoundment have occurred in streams and lakes containing valuable salmon and steelhead ecosystems, the result has usually been detrimental to the fisheries resource.

Government agencies are now expected to be more effective in managing the fresh water resource that salmon and steelhead use for spawning and rearing. In particular, stewardship groups have been demanding greater protection for flows in streams. This is evident from the effort put into developing the British Columbia *Fish Protection Act* that will have provisions for flows in streams.

One focus towards restoring flows has been a stronger stance by federal and provincial governments for the management of water used by hydro-electric power facilities around the province (Anon. 1995). The hydro-electric industry has been one of the larger users of water which has significantly affected fish populations, including salmon and steelhead, over the last century. Recently, these facilities received considerable attention regarding impacts to salmon and steelhead habitat (Hirst 1991, Anon. 1995, Ward 1996a, 1996b, Yassien et al. 1998). The largest hydro-electric entity in the province is BC Hydro and Power Authority which holds 88 licences, of which 70 were granted before 1962. Most of these licences do not have clauses or conditions relating to the protection of fish or fish habitat. Originally, these licences were reviewed and approved based on the environmental and social criteria of the time; however, current social values are different and the Province wants to make sure that non-power concerns, including fish and fish habitat, are given appropriate consideration in BC Hydro operations.

Consequently, in November 1996, the British Columbia Ministers of Employment and Investment, and Environment, Lands and Parks, announced the creation of the water use planning process. This initiative was, in part, a response to a public interest for the government to have greater consideration of impacts by the BC Hydro on fish and other water users. As part of the 1996 announcement, the British Columbia Government announced a review of water licences at all BC Hydro facilities and the goal of this multi-year program is to develop Water Use Plans (WUPs) for all of its licences around the province. The southern interior, coastal and Vancouver Island generating facilities were to be addressed first.

Water use planning is a formal mechanism that determines how holders of water licences are to use water in British Columbia; however, this exercise is not necessarily confined to hydro power projects. Because of its ability to draw all interested parties into the same room to seek a consensus, water use planning may become a powerful tool to protect and restore salmon and steelhead habitat.

3. Restoring Fish Habitat Resulting From Effects of Water Abstraction, Damming and Diversion

The development of water resources around the world has altered the natural flow of many rivers (Richter et al. 1997) including important salmon and steelhead streams in British Columbia. It has long been recognized by the scientific community that the amount and the way water is used can negatively impact on aquatic ecosystems (Ward and Stanford 1979, Lillehammer and Saltveit 1984, Petts 1984, Cushman 1985, Calow and Petts 1992). Many of the most important rivers in North America no longer support the historic numbers of native species or have intact ecosystems due to human-initiated changes to flow (Naiman et al. 1995, National Research Council 1992).

Restoration initiatives for streams with disrupted flows are now becoming more common for many of these watersheds. Franklin (1993) suggests that a holistic view must be taken to restore natural variability in the physical and biological processes in order to advance ecosystem restoration. Poff et al. (1997) argue that the ecological integrity of river ecosystems depends on their natural dynamic characters. They suggest that just as rivers have been incrementally modified, they can be incrementally restored. Clearly, the ultimate incremental technique, with regard to water flows, is the decommissioning and removal of a dam. In British Columbia, there is currently an initiative to determine a feasible way of dealing with historic salmon and steelhead habitat losses in the Theodosia River near Powell River through decommissioning by dam removal; however, for most dammed rivers, decommissioning is not an option. In many other cases, water use planning is a reasonable alternative that can provide significant incremental benefits for fish habitat.

Many aspects of flows must be taken into consideration when embarking on a water use planning exercise in order to assist salmon and steelhead. Poff et al. (1997) suggest that the first step towards developing better flows to restore river ecosystems is to recognize that extensive human alteration of river discharge has caused widespread geomorphic and ecological changes, and that includes the very important natural flow regime. Furthermore, fish and other aquatic organisms need habitat features that cannot be maintained simply by providing minimum water flows alone (Stalnaker 1990). Poff et al. state that: "...[a] range of flows is necessary to scour and revitalize gravel beds, to import wood and organic matter from the floodplain, and to provide access to productive riparian wetlands. Inter-annual variation in these flow peaks is also critical for maintaining channel and riparian dynamics...[A] large body of evidence has shown that the natural flow regime of virtually all rivers is inherently variable, and that this variability is critical to ecosystem function and native biodiversity."

This sort of thought process led to the principles for flow recommendations by Rosenau and Chilibeck (1997) for an impounded river in British Columbia. These principles generically apply to most salmon and steelhead streams in the province and include:

1. "North Pacific salmonid ecosystems in riverine environments...are adapted to natural hydrological and fluvial geomorphic processes. The scientific evidence for the functional relationship between the health of an aquatic ecosystem and its natural hydrological and geomorphic processes is unequivocal (Rasmussen 1996, Stanford et al. 1996).

2. The quality and quantity of fish habitat in fluvial systems are functions of the shape and amplitude of the discharge hydrograph, as related to fluvial processes and continuums:
   - *Base flows*: minimum thresholds of water must be in the river in order to protect aquatic life therein and lifestage-productivity...;
   - *Among-season flow variability*: life history stages of salmonid species require among-season discharges that vary according to the natural hydrograph;
   - *Within-season flow variability*: there is an assumed functional relationship between the long-term health of an aquatic ecosystem and normal frequency of within-season flooding events. This functional relationship is not clearly understood for fluvial ecosystems but is [still] considered to be a basic requirement. These stochastic events recruit...(e.g., spawning gravels, off-channel habitats, large organic debris, etc.)...and sustain fish habitats..."

Richter et al. (1997) suggest that, because fluvial processes maintain a dynamic mosaic of channel and floodplain-habitat structures (Leopold et al. 1964), the creation of patchy and shifting distributions of environmental factors sustains diverse biotic assemblages. Hydrological variation is now recognized as one of the primary driving forces within riverine ecosystems for these features to be maintained (Sparks et al. 1990, Gosselink et al. 1990, Schlosser 1991, National Research Council 1992, DeAngelis and White 1994, Sparks 1995, Stanford et al. 1996), and it must be considered in stream-flow restoration activities. Richter et al. (1997) also state that: "...[a]ccumulated research on the relationship between hydrological variability and river ecosystem integrity overwhelmingly suggests a natural flow paradigm, which states: the full range of natural intra- and interannual variation of hydrological regimes, and associated characteristics of timing, duration, frequency and rate of change, are critical in sustaining the full native diversity and integrity of aquatic ecosystems...Thus, if conservation of native biodiversity and ecosystem integrity are objectives of river management, then river management targets must accommodate the natural flow paradigm." Water use planning must consider these factors, as much as possible, when attempting to restore salmon and steelhead habitat.

4. Water Use Planning in British Columbia as a Government Initiative

BACKGROUND

In November 1996, the British Columbia Ministers of Employment and Investment, and Environment, Lands and Parks, announced the creation of a new water use planning process. This exercise would be required for specific water licences and would consider issues relating to the licenced use of water and the associated impacts of that use on other users of the water. While fish and aquatic habitat constitute priorities with respect to water resource management, the public has also become more concerned about flood control, recreational and other implications of regulating water and all concerns were to be addressed as part of this effort (Anon. 1995).

The water use planning exercise is meant to revisit the management of licenced water use for specific facilities in light of public values and environmental needs that have, in recent years, become more discerning. Some 50,000 water licences have been issued in British Columbia over the last century and some 3,600 streams have close to full allocation of their water (Rosenau and Angelo 1999).

In the initial stages, water use planning was to be undertaken for the British Columbia Hydro and Power Authority (Rosenau et al. 1998). BC Hydro holds 88 licences, of which 70 were granted before 1962, and most of these licences do not have clauses or conditions relating to the protection of fish or fish habitat. However, where significant social and environmental gains could be made with respect to other non-BC Hydro water licences, the holders of those licences may be requested to undertake water use planning as well.

THE *WATER ACT*

Water is regulated under the authority of the British Columbia *Water Act*. The Crown allocates access to water by issuing water licences. The *Water Act* can authorize an entity to:

1. divert and use water beneficially;

2. store water;

3. construct, maintain and operate works authorized under the licence and necessary for the proper diversion, storage, carriage, distribution and use of the water or power produced from it;

4. alter or improve a stream or channel for any purpose; and

5. construct fences, screens and fish or game guards across streams for the purpose of conserving fish or wildlife.

An individual or corporation may use water from a stream or lake as permitted by a water licence. The *Water Act* is administered by the Water Management Branch of the Ministry of Environment, Lands and Parks and by the Comptroller of Water Rights. The *Act* gives the Comptroller of Water Rights the powers and responsibilities relating to the issuance of water licences and the management and protection of water in the province. This gives the option to require that water use planning be undertaken for a facility that has or requires a water licence. Such water licences grant the right to construct and operate works and to store, divert or use a specified maximum amount of water for a purpose. The *Water Act* defines "works" as facilities for: "diverting, storing, measuring, conserving, conveying, retarding, confining or using water;" and "producing, measuring, transmitting or using electricity."

Although water licences often have specified conditions that direct the holder to undertake certain actions, such as protecting fish by providing minimum flows, water use planning may provide more detailed specifications for the operating conditions of the facility. Furthermore, the water use planning process is required by law to recognize all current legal and constitutional rights and responsibilities including: those accorded the water licence holder; constitutionally protected Aboriginal and treaty rights; legislated protection of fish habitat; and those ensuring human health and safety. Water use planning is not intended to fetter the Minister of Fisheries and Oceans' or the Comptroller of Water Rights' abilities to exercise all other regulatory options at their disposal. However, by having government agencies participate in the

development of a plan, it is intended that the regulatory requirements can be satisfied. The process enables all parties to express their concerns and desires prior to the implementation of the plan.

Where water rights are voluntarily diminished, and there are financial impacts on the licencee as a result of the water use planning exercise, compensation for losses will be an important consideration.

THE WATER USE PLAN

The physical product of the process is the Water Use Plan (WUP). It is a technical document that defines the detailed operating parameters to be used by facility managers in their day-to-day decisions (Anon. 1998). The WUP is intended to clarify how rights to provincial water resources should be exercised, and to take account of the multiple uses of those resources. Furthermore, it must recognize existing legal and constitutional rights and responsibilities of the water licence holders and others, as set out in legislation and court decisions (Anon. 1998).

The parameters of the WUP are designed to recognize that damming, withdrawing or diverting water can impact on different interests and users, including fish and aquatic habitat, flood control, power generation, First Nations, other licenced users, drinking water supply, recreation, forestry, navigation and others. The managers of a water facility should apply the plan's parameters to their day-to-day operations, as well as be prepared for emergency situations, such as floods. A WUP should be specific to each facility as it exists, and should not cover the whole watershed. Watershed management plans are also currently being used around the province to resolve more encompassing water issues.

The Water Use Plan is prepared through collaborative effort involving the water licencee/applicant, government agencies, First Nations, key stakeholders and the general public. Once completed, a draft WUP is submitted to the Comptroller of Water Rights for review and approval. The aim of the water use planning process and the WUP is to achieve consensus of all parties on a set of operating rules for the facility and satisfy the full range of water use interests at stake. Legislative and other boundaries are to be respected as part of the process.

OTHER LEGISLATION

Legislation other than the BC *Water Act* may be involved in water use planning where changes to a facility's operations could impact on the environment. For example, when the regulations are finally in place, the new BC *Fish Protection Act* will have provisions that provide, under certain circumstances, for the protection of water in streams for fish. Also, water control facilities can be subject to the federal *Fisheries Act*, which governs the protection of fish and fish habitat in Canada. That *Act* empowers the Department of Fisheries and Oceans Canada (DFO) to: dictate requirements for in-stream minimum water flows; construct fishways, fish guards or screens; prevent pollution; and protect fish habitat, among other matters. The federal government's Policy for the Management of Fish Habitat identifies a long-term objective of achieving an overall net gain in the productive capacity of fish habitat (Anon. 1986). The WUP process can be used to achieve the net gain policy objective at individual facilities throughout British Columbia.

Under Section 22(3) of the *Fisheries Act*, DFO can issue an order to ensure the availability of sufficient water flow from water control structures for the safety of fish and spawning grounds. In addition, Section 35(1) ensures that fish habitat is not harmfully altered, disrupted or destroyed unless authorized by the Minister of Fisheries and Oceans Canada under Section 35(2). If an authorization to destroy habitat is required under Section 35(2), it can trigger a review under the Canadian *Environmental Assessment Act*. New water control projects may be subject to the *British Columbia Environmental Assessment Act* and to both in cases where joint federal-provincial environmental reviews are required.

Finally, aboriginal and treaty rights are protected under Canada's Constitution and may have implications with regards to a Water Use Plan. These rights continue to be interpreted by case law and are site- and fact-specific.

5. The Water Use Planning Process

The following is an overview of the steps required to carry out the process required to develop a WUP. The process is supposed to be flexible enough to accommodate the needs of different water facilities and affected parties, while remaining within regulatory and legal boundaries. The effort and time expended by the process will vary for each facility, depending on issues including complexity, data collection, analysis, discussion, etc.

The information and some of the text below is taken directly from the BC Government document *Water Use Plan Guidelines* (Anon. 1998).

Step 1: Initiation and announcement

The Comptroller of Water Rights can decide that a WUP process should take place for a particular facility. This may come about as a result of a conflict between water users, a review of an existing water licence, an application for a new water licence, or a request by the licence holder or any other interested party. The Comptroller should consider information on the impacts of facility operation from the senior government agencies, First Nations, local governments and other licence holders, landowners and stakeholders. Once the process has been started, the licencee/proponent will work with the Comptroller to inform the public by announcement.

Step 2: The licencee or proponent scopes the water use issues and interests with regulatory agencies and key interested parties

The various parties first meet to scope the water use issues and interests appropriate to the facility. For the initial meetings, the proponent provides all of the existing available information including water flows and associated impacts on flooding, fish and aquatic ecosytems, and other issues. This review helps identify information gaps needing to be filled in order to undertake the plan.

Step 3: The licencee/proponent determines the consultative process to be followed and initiates it

In consultation with the Comptroller of Water Rights, the proponent or licence holder defines the consultative process for involving regulatory agencies or other interested parties in the WUP development. The purpose of the consultative process is to ensure that the most comprehensive and accurate information on water use impacts is available for all parties and the Comptroller, who is ultimately responsible for a decision. Any interested party can be involved in the WUP process, and that involvement is supposed to be meaningful, flexible and inclusive. Roles of the various parties are as follows:

1. The licencee or proponent manages the development of the WUP and submits a draft of it to the Comptroller of Water Rights. Technical information is submitted by the proponent.

2. The pertinent agencies from various levels of government are asked to attend and provide information (e.g., Fisheries and Oceans Canada and the British Columbia Ministry of Environment, Lands and Parks may supply data on fish stocks and habitat utilization).

3. First Nations are invited to the table and provided the opportunity to give input. This process should respect rights, titles and interests.

4. Other affected interests include other water licencees.

5. Recreational organizations, conservation groups and ratepayer associations may also represent their interests in the WUP process.

Step 4: The licencee or proponent, together with the other participants, confirms the issues and interests in terms of specific water use objectives

There is a confirmation by the various parties involved in the process that Steps 2 and 3 have been undertaken. They identify any significant omissions arising from the scoping or process design. Then, the objectives are articulated. Each plan must consider fisheries protection, flood control, beneficial use of water and First Nations. Other issues that may be considered include agriculture, wildlife, navigation, recreation and tourism.

Step 5: The licencee/proponent gathers additional information on the impacts of water flows on each objective

The information required to make a decision is refined and expanded. Technical studies may be required to obtain this information. Education of the various parties is a key component of this step. All information is to be made available in an open and clear sense. While all information needed to provide the "best answer" may not be available at the time of the initial planning process, these data gaps are articulated at this stage. The WUP may provide the opportunity to include "adaptive management" and this flexible and learning approach uses new information on water use impacts to be incorporated into future plans, reviews and revisions.

Step 6: The licencee/proponent, along with other interested parties, creates operating alternatives for regulating water use to meet different interests

The consultative process that involves the various parties develops a variety of different operating-regime scenarios. These are evaluated and compared with respect to the different impacts on water users. Trade-offs (costs) are estimated among the various scenarios. The alternatives should reflect a variety of opportunities available for the operation of the facility. In the case of an impoundment, this may range from no change in operations to dam removal.

Step 7: The licencee/proponent and participants assess the trade-offs between operating alternatives in terms of the objectives

The various alternatives are compared using technical analysis and discussion among the participants in the consultative process. All parties must be at the table in order to ensure that regulatory, policy and other public interests are represented. Trade-offs must occur only within the boundaries set by legislation, regulations, policy, constitutional rights and funding constraints. Uncertainty must be dealt with using the best available information but it must be recognized that it cannot be eliminated, and the analysis must recognize this.

Step 8: The participants determine and document the areas of consensus and disagreement, and prepare a consultation report

In some cases there is unanimity in the consultative group, but in other instances there is disagreement. Consensus is defined as a decision that the various parties can accept even though they may not agree with all of the details. Consensus is not a requirement of the WUP process although it is desirable. If consensus is not reached, the various parties should be able to explain why they disagree. The consultation report outlines operating scenarios and areas of agreement or disagreement amongst the parties about those options. The consultative process should be described in this report, separate from the draft WUP, and include:

1. the consultative techniques;
2. water use interests and objectives;
3. technical information;
4. operating alternatives;
5. impact and trade-off assessments;
6. discussions and negotiations; and
7. areas of consensus and disagreement.

Step 9: The licencee or proponent prepares a draft WUP and submits it for regulatory review

The draft plan includes a proposed operating regime and specific operating parameters associated with that proposal. This draft WUP is circulated to the various interested parties for comment. If consensus is achieved, then all parties may sign off on the plan. If no consensus is achieved, the licencee/proponent is responsible for choosing an operating scenario and recommending it to the Comptroller of Water Rights. The draft plan should include:

1. how the operating parameters are intended to meet the range of objectives;
2. measures for monitoring compliance;
3. notification procedures for spills and emergencies;
4. monitoring studies and reports; and
5. issues and timing for the plan review.

Step 10: The Comptroller reviews the draft plan and issues a decision

It is at this point that the draft WUP is sent to the Comptroller of Water Rights who then sends the WUP to affected and interested parties for review and comment. Any amendments to a water licence, or a new licence, must also be included in the referral. First Nations are included in the process, and the Comptroller's statutory obligations with respect to the *Water Act* are distinct from the legal obligation to consult on matters affecting treaty rights and aboriginal rights and titles. The Comptroller may demand modifications to the draft WUP. If the

Comptroller's review demonstrates that there are issues that have not been addressed or positions that have not been completely defined, an oral hearing may be ordered. If all concerns are dealt with, the plan can then be authorized by the Comptroller. Authorization may accompany:

1. the issuance of a new licence;
2. an amendment to an existing licence; or
3. a regulatory order from an engineer, as designated under the *Water Act*.

The Comptroller's order to approve or refuse a licence application can be appealed to the British Columbia Environmental Appeal Board.

Step 11: Fisheries and Oceans Canada reviews the authorized WUP and issues a decision

Fisheries and Oceans Canada (DFO), where appropriate, reviews the WUP authorized under the *Water Act* and provides advice and authorizations if it is in agreement with the plan. DFO may disagree with the Plan and exercise other regulatory options that it has available.

Step 12: The Comptroller and regulatory agencies monitor and assess compliance with the authorized WUP

The Comptroller's authorization of the WUP implements the plan. As part of the plan, measures are articulated to assess compliance. The Comptroller ensures that compliance occurs by means of regular reviews of monitoring reports.

Step 13: The licencee and Comptroller review the plan on a periodic and ongoing basis.

The WUP should provide an opportunity for scheduled reviews. These reviews are oriented to specific issues that would arise during the plan's implementation, and these are specific to the facility. The length of the review period depends on the impacts associated with the facility. The WUP can provide for the collection of information to be incorporated into the next review. A review can be ordered by the Comptroller of Water Rights should an unforeseen issue arise.

6. Discussion

Water use planning and the development of a Water Use Plan (WUP) have the potential of being powerful tools to restore salmon and steelhead habitat in those watersheds where large volumes of water have been dammed, diverted or extracted by a single facility with one or more water licences. A WUP defines the detailed operating parameters to be used by facility managers, clarifies how rights to provincial water resources should be exercised and takes account of the multiple uses for those resources. It recognizes existing legal and constitutional rights and responsibilities. Its development explicitly involves a broad range of the water use interests that are relevant for specific facilities. Once undertaken, a WUP provides the opportunity for transparency and consensus amongst stakeholders for the rational use of water.

Water use planning is currently being undertaken in a significant way for BC Hydro facilities throughout much of the province. Over 90% of the electricity produced by BC Hydro is from projects that use water. The utility operates more than 30 hydro-electric facilities, some of which are on British Columbia's richest salmon and steelhead streams and have caused substantial losses to the fish populations. However, water use planning has already been remarkably successful in redressing some of these past losses in salmon and steelhead habitat. Significant gains have already been realized through interim flow orders, part of the WUP process, at the Puntledge, Campbell, Alouette, Stave/Ruskin, Salmon, Heber, Coquitlam and Cheakamus rivers.

The recent direction from the provincial government to BC Hydro stated that draft WUPs will be completed within three years for priority BC Hydro facilities and within five years for the remaining plants. These target dates currently appear to be unattainable. However, BC Hydro, the various levels of government, and stakeholders are moving forward swiftly and the Alouette and Stave/Ruskin draft WUPs have already been submitted to the Comptroller of Water Rights.

While many of the impacts to salmon and steelhead fisheries resulting from system operations at BC Hydro facilities are being addressed, there are about 50,000 other water licences. Some of these other facilities also affect salmon and steelhead, and many of the licences attached to these works do not have fish-protection conditions contained therein. As of 1990, it was estimated that 5,500 of the 25,000 watershed sub-basins in the province had water shortages (Day and Affum 1990). It is reasonable to assume that water use planning could be an important tool in redressing historical impacts to these species by many of these other facilities.

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